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Executive Summary

Westinghouse Electric Company LLC (“Westinghouse”), in conjunction with the Missouri Department of Natural Resources (“MDNR”), recently issued an Engineering Evaluation and Cost Analysis (“EE/CA”) that evaluates potential response action alternatives to address the presence of volatile organic compounds (“VOCs”) that have been detected in private wells in the vicinity of the Westinghouse Former Fuel Cycle Facility located near the town of Hematite, Missouri (“FFCF” or the “Site”). This Non-Time-Critical Removal Action Memorandum (the “Action Memorandum”) documents Westinghouse’s selection of Alternative 4 as described in the EE/CA (public water extension to residents) as the most appropriate response action for the condition identified, and explains the bases for selecting this alternative.

This Action Memorandum follows the standard format prescribed by the United States Environmental Protection Agency (“USEPA”) in the Guidance Document *Superfund Removal Procedures Action Memorandum Guidance, EPA/540/P-90/004, December 1990*, and considers the goals of the National Contingency Plan (“NCP”), 40 C.F.R. Part 300. This Action Memorandum serves as the primary decision document substantiating the need for a removal response. The removal response described in this Action Memorandum has been developed in response to contamination identified in private drinking water wells in the vicinity of the FFCF Site, and is the second (and more comprehensive) response action to be implemented to address the impacts identified in local private wells. In June 2002, Westinghouse implemented a time-critical removal action pursuant to which public health concerns were addressed through installation of activated carbon filter units and the provision of bottled water, as needed. (*Action*

Memorandum, Former Fuel Cycle Facility, Off-site Groundwater (June 2002), hereinafter referred to as the “June 2002 Action Memorandum”). In addition, supplemental hydrogeological information was gathered as part of the June 2002 Action Memorandum that has been used in developing the EE/CA and this decision document. A copy of the June 2002 Action Memorandum is contained in the information repository maintained for this Site.

Presented below is an overview of Alternative 4 of the EE/CA that is being selected in today’s action:

1. Design and construction of an extension to the local public water supply system to the twenty-four (24) homes located in areas where private wells have been affected (*i.e.*, affected area and well #3).
2. All existing residential drinking water wells at those homes are expected to be properly abandoned in accordance with Missouri law.
3. Long-term monitoring of the contaminant plume will continue through periodic monitoring of sentry wells and approximately three (3) select private wells in the area.

All of the above tasks are being completed on an expedited basis at a cost of nearly \$1 million. This response action will be conducted with the concurrence and oversight of the State of Missouri.

I. Purpose

The purpose of this Action Memorandum is to document certain actions that are to be taken with respect to the Westinghouse Electric Company's Former Fuel Cycle Facility ("FFCF"), located in Hematite, MO (the "Site"). The actions documented in this Action Memorandum are being conducted in order to address the presence of VOCs in the local aquifer in the vicinity of the Site, and to mitigate potential impacts to the public related to these compounds. Several alternatives to address this condition were described and evaluated in the Engineering Evaluation and Cost Analysis ("EE/CA") that was issued by Westinghouse in January 2003. In January and February 2003, Westinghouse sought input from the public on the EE/CA through a formal public comment period. After consideration of the public's comments, Westinghouse selects Alternative 4 (provision of public water to residents) as the most appropriate response to address the identified conditions. MDNR approves selection of this alternative. As described below, this removal action is part of a comprehensive response action that is being implemented at the FFCF Site, and is expected to be consistent with other response actions that may be undertaken in the future.

II. Site Conditions and Background

The FFCF ceased production in June 2001, after nearly 47 years of operations under various owners and operators. The facility manufactured nuclear fuel components and assemblies from 1956 until 2001, and was operated by five different owners.

Westinghouse acquired the plant in April 2000. Prior owners included Asea Brown

Boveri (ABB) from 1989-2000, Combustion Engineering (CE) from 1974 to 1989, Gulf United Nuclear Fuels Corporation from 1970 to 1974, United Nuclear Corporation from 1961 to 1970, Mallinckrodt Nuclear Corporation from 1959 to 1961, and Mallinckrodt Chemical Works from 1956 to 1959.

Westinghouse has identified fourteen (14) potential areas of concern (“AOCs”) at the Site, and plans on following a systematic process to further evaluate these areas.

Westinghouse anticipates that the Nuclear Regulatory Commission (“NRC”) and the MDNR will provide critical input in defining the regulatory path to remediating and decommissioning the Site. This Action Memorandum is related to AOC #1, which is defined as the impacted groundwater potentially associated with past activities at the Site.

As discussed in greater detail below, this is the second removal response being undertaken for AOC #1. In particular, carbon filtration units and bottled water were provided to specified residents, as needed, as part of a time-critical removal action in June 2002. Since that time, additional hydrogeologic information has been collected, and several more long-term alternatives have been evaluated to address these conditions.

This subsequent evaluation was performed as a non-time-critical removal action under the NCP, and is documented in the EE/CA. Today’s Action Memorandum serves as the culmination of that evaluation.

A. Site Description

1. Removal Site Evaluation

Groundwater conditions at the Site have been evaluated in the past. In particular, a site investigation by the MDNR in 1996 revealed the presence of VOCs in several monitoring wells located on-site. Four private wells located east of the Site were sampled at that time, and no contaminants were found.

In December 2001, the Missouri Department of Health and Senior Services (“DHSS”) conducted annual radiological monitoring (gross alpha/gross beta) of four private wells near the Site. Samples were also collected for VOCs at the request of the MDNR. Results of that sampling revealed that one of the private drinking water wells sampled by DHSS exhibited VOC concentrations, including tetrachloroethylene (PCE) and trichloroethylene (TCE), above drinking water standards. This well (*i.e.*, Well #3) is located northeast of the Westinghouse Site, at a residence situated on Westinghouse property. This well had been last sampled for VOCs in 1996 and did not contain VOCs at that time. Once informed of this finding, Westinghouse and the MDNR conducted follow-up testing. In March 2002, Westinghouse tested 20 additional wells southeast of the Site, five of which were found to be impacted by VOCs (bringing the total number of affected wells identified at that time to six). In April 2002, MDNR and DHSS sampled additional private wells, while Westinghouse conducted repeat sampling of those previously sampled. Analytical results from

the sampling event in April 2002 showed no additional private wells were affected. In July 2002, the first round of quarterly sampling was conducted, and detectable levels of VOCs were found in two more private wells, bringing the total number of affected wells to eight. Except for well #3, which is located primarily to the east, all of the affected wells are at residences located southeast of the Site.

Based upon these findings, it was determined that a removal action may be appropriate for these identified conditions. Prior removal activities have been undertaken with respect to this condition as discussed in greater detail in Section II.B.1. Additional evaluation activities have been conducted at the Site and are summarized below and in other site documents contained in the information repository for this Site.

2. Physical Location

The FFCF Site is approximately 228 acres, of which eight acres have most recently been used for operations. The Site is located in the east portion of Missouri in Jefferson County near the town of Hematite. It fronts the eastbound lane of Missouri State Road P, between the hills to the northwest and a terrace/floodplain of Joachim Creek to the southeast. The topography slopes gently to the southeast eventually blending with the alluvial floodplain deposits of the Joachim Creek, which runs along the southeastern edge of the Site property and flows into the Mississippi River.

Groundwater use within four miles of the Site is extensive. At least 11,771 people are served by public wells in the area, and an estimated 978 people are served by private wells. More details regarding the physical location and characteristics of the Site can be found in the EE/CA.

3. Site Characteristics

The facility was opened in the mid-1950s by Mallinckrodt Chemical Works, and through the mid-1970s, was owned and operated by a variety of entities, including United Nuclear Corporation and Gulf United Nuclear Fuels Corporation. Until the early 1970s, the Site was heavily involved in producing uranium for the United States Navy and United States Department of Energy. In the mid-1970s, Combustion Engineering Inc. acquired the property and began commercial nuclear fuel production. Westinghouse purchased the facility in April 2000 from Asea Brown Boveri. There are currently no manufacturing operations at the Site.

Primary functions at the Site throughout its history have included the manufacture of uranium metal and uranium compounds from natural and enriched uranium for use as nuclear fuel. Specifically, operations included the conversion of uranium hexafluoride gas of various ^{235}U enrichments to uranium oxide, uranium carbide, uranium dioxide pellets, and uranium metal. These products were manufactured for use by the federal government and government contractors and by commercial and research reactors approved by the Atomic Energy Commission. Research and

development was also conducted at the Site, as were uranium scrap recovery processes.

4. Release or Threatened Release into the Environment of a Hazardous Substance, or Pollutant or Contaminant.

The major contaminants of concern for this removal action are perchloroethylene (“PCE”), trichloroethylene (“TCE”), and their degradation products. These volatile organic compounds are considered to be “hazardous substances” as defined by the Comprehensive Environmental Response, Compensation, and Liability Act (“CERCLA”), 42 U.S.C. § 9601(14), and its implementing regulations.

Sampling activities at and around the Site recently have revealed the presence of PCE, TCE, and their degradation products in groundwater. The EE/CA presents and discusses data from the private well sampling program revealing off-site groundwater contamination of drinking water wells. The presence of these contaminants in private water wells, if left unaddressed, could present a risk to human health and/or the environment. As a result, expeditious response activities already have been undertaken by Westinghouse as part of a time-critical removal action as discussed in Section II.B.1. The actions selected in this Non-Time-Critical Removal Action Memorandum are designed to address these concerns on a more permanent basis.

5. NPL Status

The FFCF Site is not currently on the National Priority List (“NPL”), nor is it proposed to be. No official HRS ranking has occurred for the Site.

Westinghouse and the MDNR have signed a letter of agreement (“LOA”) which forms the basis for payment of costs incurred by the MDNR in connection with its oversight of Westinghouse’s response activities. Site characterization efforts are currently being designed to follow not only CERCLA and the NCP, but also the requirements of the Nuclear Regulatory Commission and the MDNR to decommission the facility as required under law.

6. Maps Pictures, and Other Graphic Presentations

Site maps, figures, and related features are included in the EE/CA and its attachments.

B. Other Actions to Date

1. Previous Actions

A number of investigative actions have been conducted in the past at this Site. These steps have been summarized in other documents, including the June 2002 Action Memorandum, a copy of which is contained in the information repository. In addition, in response to the identification of VOCs in the groundwater in the vicinity of the FFCF Site, Westinghouse, in conjunction with MDNR, determined that a time-critical removal action was appropriate to mitigate potential risks to residents in the vicinity of the Site.

Westinghouse prepared the June 2002 Action Memorandum to document its time-critical response to these conditions.

Major components of the June 2002 time-critical removal Action Memorandum that Westinghouse has implemented include the following:

- Mitigation of the public health concerns via well testing, installation of point-of-entry water treatment systems (*i.e.*, activated carbon treatment units), and provision of bottled drinking water, as required.
- Establishment of “sentinel” or “sentry” wells, *i.e.*, four wells installed near Site boundaries between potentially impacted groundwater and the community.
- Deep bedrock core drilling and geophysical testing to establish hydrogeologic conditions.
- Quarterly well monitoring of private wells and the sentinel wells.
- Geophysical analysis to provide additional detail for geologic and hydrogeologic information gathered during the coring and permeability testing.

2. Current Actions

As noted above, in connection with the June 2002 Action Memorandum, Westinghouse supplied bottled water to those residences most likely to be affected by contaminated drinking water. In addition, for those homes that demonstrated detectable levels of VOCs, Westinghouse arranged for the

installation of activated carbon filtration systems. The carbon filtration systems have been monitored monthly to assess the performance of the units. In addition, Westinghouse has developed a quarterly monitoring program for a network of residences in the area to assist in monitoring potential movement of the VOC plume in the groundwater.

As part of the June 2002 Action Memorandum, Westinghouse implemented an investigative program, including the installation of monitoring wells at six strategic locations, in order to evaluate the nature and extent of contamination in the groundwater in the vicinity of the Site. The drilling program included drilling and monitoring well construction in the overburden in two locations, and coring and drilling and monitoring well construction in the bedrock in four locations. Data obtained from these efforts has been summarized and discussed in the EE/CA.

Westinghouse has developed a community relations program providing public meetings and workshops with the local community, and meetings with stakeholders including the MDNR, Missouri Department of Health, Jefferson County Health Department, and the County Commissioners. In addition, Westinghouse has engaged in an extensive community outreach program as it relates to the EE/CA. Included among these community relations steps are the following:

- The EE/CA was introduced at a public meeting on January 28, 2003. A public comment period was announced on that day, and remained open until February 28, 2003.
- The public was notified that an information repository was established at the Festus Public Library. The EE/CA also was made available for public viewing on an MDNR website.
- Westinghouse hosted a community work group meeting on February 3, 2003 to discuss the EE/CA. This meeting was attended by community members and local public officials.
- Westinghouse issued several press releases regarding the EE/CA, and the EE/CA was the subject of several local newspaper articles.
- Westinghouse solicited and received comment on the EE/CA from MDNR and DHSS. As noted below, these agencies have expressed their support for the preferred alternative (Alternative 4).

C. State and Local Authorities Role

1. State and Local Authorities Actions to Date

VOC contamination in private wells was first identified in results from annual samples taken by DHSS in December 2001. The DHSS referred the matter to the MDNR. MDNR informed Westinghouse of the sampling results and the necessity for removal action. As documented in the June 2002 Action Memorandum, Westinghouse, with MDNR approval, provided bottled water to residences in the potentially affected areas and for installation of activated

carbon filtration systems in eight private residences found to have VOC contamination in their well water. The MDNR, DHSS, and the Jefferson County Health Department have participated in subsequent sampling of groundwater from local private residences. The MDNR, in particular, has been extremely active in project oversight and community outreach activities as it relates to these private well water issues.

As noted above, the EE/CA and its supporting documentation have been reviewed by both the MDNR and the DHSS. Each agency has provided its written support for the selection of Alternative 4. These letters are on record in the Site's information repository. The MDNR signature on this Action Memorandum demonstrates the department's approval of Alternative 4.

2. Potential for Continued State/Local Authority Response

Several planning meetings have been held between State and County representatives and Westinghouse. Jefferson County Commissioners have requested to be kept updated on Site activities via teleconference prior to the public meetings. As noted above, Westinghouse is scheduling public meetings as part of its community relations plan.

MDNR has assigned a project manager and a community relations coordinator for the FFCF project. The MDNR, DHSS, Jefferson County Health Department and Westinghouse are included in meetings with the County Commission. The

letter of agreement (“LOA”) between Westinghouse and the MDNR specifies the submittal of an annual Site management plan identifying schedule and tasks.

III. Threats to Public Health or Welfare or the Environment, and Statutory and Regulatory Authorities

A. Threats to Public Health or Welfare

Pursuant to Section 300.415(b)(2) of the NCP, a removal action is deemed to be appropriate in certain situations. For example, the NCP authorizes alternative water supplies to be provided to the public where necessary to immediately reduce public exposure to impacted household water. In conjunction with state regulatory agencies, it has been determined that the presence of VOCs above drinking water standards in private residential wells in the vicinity of the Site may present a threat to public health and welfare if left unaddressed. As a result, Westinghouse, in conjunction with MDNR, determined that a time-critical removal action was appropriate to mitigate potential risks to residents in the vicinity of the Site. As discussed above, Westinghouse prepared an Action Memorandum to document its response (bottled water, filtration units, as needed, and additional investigation).

At the time that the June 2002 Action Memorandum was issued, it was understood that additional evaluation of Site conditions would be necessary, and that, depending upon the findings, a longer-term response strategy may be required. As a result, Westinghouse conducted the current EE/CA to consider these longer-term issues.

B. Threats to the Environment

There is no quantified threat to the environment associated with the presence of VOCs in private wells in the vicinity of the Site, which is the subject of the EE/CA and this Action Memorandum. This issue is expected to be addressed through the RI/FS.

IV. Endangerment Determination

Actual or threatened releases of hazardous substances from this Site, and/or in the vicinity of the Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. Proposed Actions and Estimated Costs

A. Proposed Actions

1. Proposed Action Description

Westinghouse evaluated several potential alternatives to address identified conditions. Westinghouse's evaluation is presented in the EE/CA. The EE/CA was presented for public comment at a public meeting on January 28, 2003.

Westinghouse received comments until February 28, 2003. Responses to the comments are included in the Responsiveness Summary that is attached to this Action Memorandum. The Responsiveness Summary also describes the efforts

undertaken by Westinghouse and MDNR with regard to community involvement.

The selected action to address the identified contamination in private wells is described in the EE/CA as Alternative 4: Public Water Extension to Residents.

This alternative includes the design and construction of an extension to the local public water supply system to the 24 homes located in areas where private wells have been affected (*i.e.*, affected area and well #3). All existing residential drinking water wells at those homes are expected to be properly abandoned in accordance with Missouri Well Construction Code, *10 CSR 23-3*.

In this alternative, it is anticipated that further monitoring of the contaminant plume will be necessary. Upon provision of public water to the affected area, long term monitoring of approximately three (3) select remaining private wells in the area will continue. Several additional monitoring wells are also expected to be installed as part of the ongoing Site investigation (*i.e.*, the RI/FS) that will provide information to assess contaminant migration. These wells are expected to be sampled periodically until a long-term monitoring program has been established for the Site.

2. Contribution to Remedial Performance

Removal actions need to be consistent to the extent possible with any likely remedial action that may be selected for the Site. This removal action meets that requirement in that it provides for a cost-effective, implementable long-

term response that will prevent exposure to contaminated drinking water in the vicinity of the Site.

3. Description of Alternative Technologies

The EE/CA provides a detailed evaluation of each of the alternative technologies considered as part of the non-time-critical removal action. In summary, these alternatives include:

- Alternative 1 -- No Action Alternative
- Alternative 2 -- Provision of bottled drinking water and installation and monitoring of point-of-entry systems
- Alternative 3 -- Installation of deeper private wells
- Alternative 4 -- Extension of existing public water supply

Each of these alternatives is described in greater detail in the text of the EE/CA.

4. EE/CA

The EE/CA describes, evaluates, and compares the response alternatives identified above. Alternative 4 was the alternative preferred in the EE/CA, and is the approach being adopted in this Action Memorandum. As noted above, the Responsiveness Summary, which contains Westinghouse's responses to public comments received on the EE/CA, is attached to this Action Memorandum.

5. ARARs

Applicable or relevant and appropriate requirements ("ARARs") of federal and state laws will be complied with to the extent practicable under the circumstances. Among ARARs that may apply are Maximum Contaminant Levels (MCLs) under the Safe Drinking Water Act, 42 U.S.C. §§300f, et seq., its implementing regulations and state counterparts. ARARs are more fully discussed in Section 3.5 of the EE/CA.

6. Project Schedule

Construction of the water supply extension (Alternative 4 in the EE/CA) is expected to be completed by November 2003.

B. Estimated Costs

As described in the EE/CA, the total cost associated with implementation of Alternative 4 (Connection to Public Water Supply) is \$922,598. The net present worth cost of this alternative, using a 7% discount factor, is also presented therein as \$818,388.

VI. Expected Change in the Situation Should Action be Delayed or Not Taken

Carbon filtration units and bottled water currently are being provided pursuant to the June 2002 Action Memorandum and, thus, the most immediate risks presented by site conditions have been mitigated. Although appropriate from a time-critical perspective, these steps are not considered to be the best approach to take in the longer run. The

selection and implementation of Alternative 4 as described in the EE/CA will allow for a more long-term response to offsite groundwater issues, taking into consideration factors of effectiveness, implementation, and cost as required by the NCP and U.S. EPA's EE/CA guidance.

VII. Outstanding Policy Issues

No outstanding policy issues have been identified at this time.

VIII. Enforcement

A. Government Involvement

As noted above, Westinghouse is working with the appropriate regulatory agencies to respond to the circumstances presented, and to properly implement the steps identified in this Action Memorandum. Westinghouse and MDNR have signed a Letter of Agreement that forms the basis for payment by Westinghouse to the MDNR for certain negotiation and oversight costs associated with the Site and this removal action.

B. PRP Search

Westinghouse has begun a search for potentially responsible parties ("PRPs") to share in the response costs associated with this Site in general, and this removal action in particular. Westinghouse has advised several parties of their potential liability for conditions at and associated with the Site, including the United States government and other former owners and operators of the Site.

IX. Recommendation and Approval of Action

This decision document represents the selected non-time-critical removal action for the offsite groundwater impacts in the vicinity of the FFCF Site in Hematite, Missouri, developed in accordance with CERCLA, as amended, and the NCP. The selection of Alternative 4 is based on the administrative record for the Site.

In summary, Alternative 4 was selected for the following reasons:

- it is the most reliable and effective alternative for protecting human health;
- it can be implemented with limited technical difficulty;
- it is the most permanent alternative;
- it received general public and governmental acceptance;
- it is a cost-effective solution;
- it complies with applicable or relevant and appropriate requirements to the greatest extent practicable; and
- it is consistent with and does not conflict with future planned response activities at the Site.

Westinghouse believes that the selected approach will most effectively reduce any potential risks to human health and the environment that conditions may pose. The MDNR and DHSS concur with the selected response action.

DECLARATION

The selected alternative provides the best balance among the various alternatives considered with respect to the criteria evaluated. Westinghouse believes that the selected alternative will be protective of human health and the environment, will comply with applicable or relevant and appropriate requirements, will be cost effective, and will utilize treatment and/or permanent solutions to the maximum extent practicable. The cleanup is therefore in accord with the overall requirements and objectives of CERCLA.

After the selected objectives of this alternative are achieved, Westinghouse will continue to evaluate and monitor environmental conditions at the Site in connection with other ongoing environmental projects at the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal, and the actions specified in this Action Memorandum are hereby approved.

APPROVED this _____ Day of May 2003.

WESTINGHOUSE ELECTRIC COMPANY LLC

By: (Original signed)
Thomas Dent
Director, Decommissioning

MISSOURI DEPARTMENT OF NATURAL RESOURCES

By: (Original signed)
Julieann Warren
Chief, Site Evaluation Unit

ATTACHMENT